REMARKS

Claims 1, 4-7, 14-16, and 18 are in the application for further consideration. Claim 1 has been amended to recite that the TFE/PEVE copolymer is stabilized as formerly recited in claim 8, now canceled. Stabilization involves the fluorine treatment of the TFE/PEVE copolymer as described in EP 0 226 668 as disclosed in the paragraph bridging pp. 5 and 6 of the present specification. As disclosed in this bridging paragraph, the fluorine treatment converts the unstable end groups that decompose to volatile product that causes bubbles and voids in rotolinings to stable $-CF_3$ end groups. Thus, stabilization of the TFE/PEVE copolymer provides a copolymer that does not bubble during rotolining. The absence of bubbling after fluorine treatment is disclosed in the table accompanying Example 2 of EP'668.

One aspect of the present invention is the discovery that addition of a small amount of non-bubble promoting metal powder to TFE/PPVE copolymer enables it to adhere to a substrate. Another aspect of the present invention is the discovery that the same addition to TFE/PEVE copolymer gives a much better adhesion result. Neither copolymer adheres to substrate by itself as disclosed on p. 11, 11-14, which confirms the disclosure in the Scheirs publication referred to in the paragraph bridging pp. 1 and 2 of the present specification. Example 1 of the present specification discloses that with just the addition of 0.5 wt% Zn, Sn, or Cu to the copolymer, the adhesive bond to the substrate for the TFE/PEVE copolymer is more than double the adhesive bond for the TFE/PPVE copolymer. Because of the better result with TFE/PEVE copolymer, this is the focus of the claims to the present invention. The claims as just amended also focus on the TFE/PEVE copolymer being stabilized. Example 2 discloses that stabilization of the TFE/PEVE copolymer causes the copolymer to lose about one-half of its adhesive bond to the substrate. The resultant peel strength of 53 lb/in for the stabilized TFE/PEVE copolymer is nevertheless very strong. The claims to the present invention are limited to stabilized TFE/PEVE copolymer as the recipient for the metal powder additive because it has been found that the TFE/PEVE copolymer/metal powder composition provides a superior rotolining in commercial operation.

The invention as defined in claim 1 is directed to a high minimum adhesion to the substrate as indicated by the minimum peel strength of at least 25 lb/in recited in the claim. Thus minimum peel strength by definition limits the identity and amount of the metal powder that provides this adhesion result. Only a small amount of the metal powder provides this result. As the metal powder content increases from 1.2 wt%, the adhesion diminishes (p. 7, l. 19-23). Example 2 discloses provides some quantification of this concentration effect. As the Zn powder content increases from 1 wt% to 5 wt%, the peel strength falls from 53 lb/in to only 14 lb/in.

Excluded from the metal powders recited in claim 1 are those that cause bubbling. Applicant found that Al powder in small amounts causes bubbling (p. 3, l. 20-22).

All of the claims have been rejected as being obvious over Wu in view of JP'593. Wu discloses the formation of TFE thermoprocessible copolymer microspheres having a certain morphology defined by shape, size, and bulk density (col. 1, l. 5-10 and col. 2, l. 25-30). Wu discloses seven groups of TFE comonomers for making the TFE thermoprocessible copolymer. One of these groups is defined by the formula CF_2=$CFOR_f$ wherein CF_3, C_2F_5, and C_3F_7 are disclosed as examples (col. 2, l. 46-48). TFE/PPVE copolymer, commercially called PFA, is disclosed to be the preferred copolymer of this group (col. 3, l. 35-36). The microspheres are disclosed as being useful in rotomolding and rotolining, wherein examples of rotomolding are tanks bottles and vessels, and examples of rotolining are coatings for pipes, fittings, valves, and tanks (col. 5, l. 39-53). The rotolining is not disclosed to adhere to the mold surface and indeed it cannot adhere to the mold surface as indicated by the fact the rotomolding of the same copolymer must be removable from the mold to form tanks, bottles, and vessels. It is disclosed, however, the microspheres provide the benefit of a bubble-free rotomolded article of PFA (Example 7).

JP'593 discloses the incorporation of 0.1 to 30 wt%, of inorganic or metal powder such as glass, silicon, zinc, aluminum, and copper, into PFA to remove bubbles coming from the PFA during rotolining [0011, 0016 and 0018]. In JP' 593, the problem of the PFA bubbling during rotolining is solved by adding the fine powder to the PFA.

Both Wu and JP'593 address the bubbling problem in rotolining. Wu solves the problem by certain polymer morphology that is broadly applied to an array of fluoropolymers. JP'593 solves the problem by adding inorganic or metal powders to PFA.

No prior art has been cited against the stabilization aspect of the present invention, formerly presented in claim 8. Stabilization of the PFA solves the bubbling problem by converting end groups that decompose to volatile products during melt processing to stable end groups.

The final rejection refers to the prior office action. The prior office action of September 9, 2008 refers to the prior office action. It is therefore understood that the explanation of the obviousness rejection is in the Office Action dated April 28, 2008. This rejection (a) relies on Wu disclosing TFE/PEVE copolymer as a rotolining composition that is dry and melt flowable and has a particle size encompassing the particle size in Applicant's claim 1, (b) admits that Wu does not disclose the metal powder additive of Applicant's claim 1, and (c) relies on JP'593 as disclosing fine metal powder to PFA in order to suppress bubbling. The motivation for the modification of Wu to include the metal powder of JP'593 is the desire and expectation to suppress bubbling. The rejection admits that neither Wu nor JP'593 discloses improved adhesion, but dismisses this as an inherent result.

With respect to the combination of JP'593 into Wu, the legal standard for assessing obviousness in a rejection based on the combination of references is stated in KSR International Co. v. Teleflex Inc, 82 USPPQ2d 1385 (Sup. Ct. 2007) as follows:

> "A court must ask whether the improvement is mote than the predictable use of prior art elements according to their established functions." (p. 1389)
>
> "The combination of familiar elements according to known methods is likely to be obvious when it does no more that yield predictable results." (p. 1395)

That certain metal powders in small amounts will achieve a peel strength of at least 25 lb/in for stabilized TFE/PEVE copolymer is not a prior art established function and is not a predictable result from any of the prior art disclosures. Thus, JP'953 is not combinable with Wu as a suggestion of the invention of claim 1.

The motivation asserted for the JP'953 modification of Wu to include the metal powder of JP'593 is the desire and expectation to suppress bubbling. No reason is provided as to why the JP'593 teaching for suppressing bubbling would be obviously applicable (to one skilled in the art) to the Wu teaching which already solves the bubbling problem by particle morphology. As stated in KSR:

> "As is clear from cases such as *Adams*, a patent composed of several elements is not proven obvious merely by demonstrating that each of its elements was, independently known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two know devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed invention does." (p. 1396)

One skilled in the art has no reason for incorporating JP'593 into Wu, Wu having already solved the bubbling problem. One skilled in the art faced with the problem of adhering stabilized TEF/PEVE copolymer to provide a peel strength of at least 25 lb/in is not led to either Wu or JP'593 for the solution to this problem as recited in claim 1.

Should there be any doubt that there is no reason for combining JP'593 into Wu for suppressing bubbles, when Wu has already solved this problem, this fact situation has already been considered in the context of the KSR treatment of hindsight as follows:

> "The Court of Appeals, finally drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautions of arguments reliant upon ex post reasoning.....Rigid preventive rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor inconsistent with it." (p. 1397)

In both Ex parte Green, Appeal no. 2007-1271 and Ex parte Rinkevich and Garrison, Appeal 2007-1317, the Board of Patent Appeals and Interferences citing the KSR recourse to common sense concluded that the combining of references to solve a problem already solved by one of the references failed the common sense test, i.e. was not an obvious combination to one skilled in the art. As in Green and Rinkevich and Garrison, it is not obvious to one skilled in the art to combine JP'593 into Wu to suppress bubbles, when Wu has already solved the bubble problem.

The Office Action dated September 9, 2009 mentions another motivating factor for combining JP'593 into Wu, in connection with the rejection of claim 8 (stabilization) now incorporated into claim 1. This rejection concludes obviousness of the stabilization of claim 8 claim based on assertions (a) polymer stabilization is performed for reasons other than suppressing bubbles during melt processing such as increasing shelf life, (b) the prior art need not disclose the same purpose as the claimed method, and (c) the additional advantage flows naturally from the prior art, citing Ex parte Obiaya.

In response to these assertions, Re(a): Just as the desire for bubble suppression forms no reason for combining JP'593 into Wu, the same is true for "shelf life". There is no support in the literature or in logic that the unstable end groups removed by fluorination have any effect on shelf life. The degradation avoided by stabilization is an effect occurring during melt processing, i.e. the copolymer is in the molten state. Obviously, the copolymer is not stored in the molten condition.

Re(b): The reference to different purpose and it serving as a rationale for an obviousness rejection is not understood. The stabilization of TFE/PEVE copolymer solves the bubbling problem but not the adhesion problem. The stabilized TFE/PEVE copolymer does not adhere to the substrate. The stabilization of TFE/PEVE copolymer does not have a different purpose.

Re(c): The different purpose under (b) above is converted to "another advantage" under (c). Just as there is no different purpose of stabilization, there is no additional advantage.

The prior art does not suggest how to adhere stabilized TFE/PEVE copolymer to a substrate with a minimum peel strength of at least 25 lb/in or Applicant's solution to this problem as recited in claim 1.

With respect to the Examiner's position that the combined Wu/JP'593 composition necessarily possesses the claimed peel strength, the combined composition is never identified in the rejection. The reference to "necessarily" in the explanation of inherency, however, suggests recognition of the legal requirement for the result to necessarily occur, i.e. that may occur is not enough, in accordance with Continental Can Co. v. Monsanto Co. 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) and In re Robertson, 49 USPQ2d 1949, 1950-1951 (Fed. Cir. 1999). Wu discloses a variety of fine powders, both inorganic powder and metal powder, the broad composition range of 0.1 to 30 wt%. Applicant's specification discloses that the adhesion result is confined to the use of only small amounts of the metal powder that itself does not cause bubbling in this small amount. The selection possibilities for the fine powder and amount within the broad disclosures of JP'593 to obtain the bubble-free condition and not in accordance with Applicant's disclosure does not necessarily arrive either at the minimum adhesion of 25 lb/in or achievement of this result with stabilized TFE/PEVE copolymer.

The unpredictability of the strong adhesive bond achieved by the stabilized TFE/PEVE copolymer/metal powder composition is a surprising result, which is part of the claimed invention "as a whole" (35 U.S.C. 103(a)) and indicative of patentability, In re Soni, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995), In re Chupp, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987).

The Office Action dated September 9, 2008 criticizes the assertion of unexpected results of the unexpected results on the basis that the evidence thereof is not commensurate with the scope of the claims. This criticism never looks at the scope of the claims. The scope of claim 1 is quite narrow, in that it is limited to a particular copolymer, TFE/PEVE copolymer, and as amended, to the stabilized condition for the copolymer. The amount of metal powder is quite small and within the narrow range of 0.2 to 2 wt%. Both the identity of the powder and its amount within the small concentration range claimed are limited in scope because of the claim requirement that the minimum peel strength is 25 lb/in. Example 1 demonstrates unexpected results for 0.5 wt% Zn, Sn, and Cu for unstabilized TFE/PEVE copolymer, i.e. achieving a peel strength of at least 77.4 lb/in. Example 2 shows that 1 wt% Zn added to stabilized TFE/PEVE copolymer reduces the peel strength by about 50%. The peel strength obtained when Sn and Cu are used in unstabilized copolymer is so high that it is predictable that greater than 25 lb/in will result when the TFE/PEVE copolymer is stabilized with Sn or Cu, as well. Claim 1 insures this result by requiring the peel strength to be at least 25 lb/in.

MPEP 716.02(d) allows for predictability of results to claim a broader range than actually shown. Examples 1 and 2 of the present application fully support the limited scope of

the metal powder and its amount recited in claim 1. Claims 4-6, 14, 15, and 16 provide additional specificity to the features recited in claim 1.

While claim 14 is unobvious and therefore patentable on the same basis as claim 1, it is noted that the Final Rejection asserts obviousness of this claim on the basis of its being encompassed by the Wu fine powder range of 0.1 to 30 wt%. The Office Action dated April 28, 2008, amplifies this assertion by referring to MPEP 2144.05(I) for the proposition that when a claimed range lies inside a prior art disclosed range, a *prima facia* case of obviousness exits. This proposition does not apply when the claimed range provides a different and unpredictable result as in the present invention. Of course, the different result recited in claim 1 (peel strength at least 25 lb/in) is not the only difference from JP'593. Neither the TFE/PEVE copolymer nor its stabilization condition are disclosed in JP'593. It is not *prima facia* obvious to use 0.3 to 1.2 wt% of metal powder in stabilized TFE/PEVE copolymer to obtain a peel strength of at least 25 lb/in. Neither Wu nor the fact that stabilization suppresses bubbles in PFA combines with JP'593 to suggest this result.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

A one-month petition for extension of time and payment of the required fee is filed herewith.

Respectfully submitted,

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